

AMENDMENT TO THE CLAIMS

Please enter the following amendments to the claims without prejudice, without admission, without surrender of subject matter, and without any intention of creating any estoppel as to equivalents as follows:

1. (currently amended) A non-naturally occurring intein or cleavage or cleavage and splicing moiety having splicing activity and/or controllable cleavage activity, wherein the intein is a truncated Mtu *recA* intein with the endonuclease domain deleted, and V67L and/or D422G mutation(s), wherein the truncated Mtu *recA* intein is  $\Delta$ I-CM or  $\Delta$ I-SM, or any full-length Mtu *recA* intein having a D to G mutation in a location corresponding to residue 422 of the full-length Mtu intein, by sequence homology or any intein having a V to L mutation in a location corresponding to residue 67 of the full-length Mtu intein, by sequence homology V67L and/or a D422G mutation(s).
2. (original) The intein of claim 1 comprising a truncated intein.
3. (original) The intein of claim 1 wherein the cleavage activity is controllable by varying at least one physical condition or by varying at least one chemical condition or by varying both at least one physical condition and at least one chemical condition.
4. (original) The intein of claim 3 wherein the cleavage activity is controllable by varying pH.
5. (original) The intein of claim 3 wherein the cleavage activity is controllable by varying temperature.
6. (original) The intein of claim 3 wherein the cleavage activity is controllable by varying ion concentration, presence or absence.
7. (original) The intein of claim 3 wherein the cleavage activity is controllable by at least two of: varying pH, varying temperature, and varying ion concentration, presence or absence.
8. (original) The intein of claim 3 wherein the cleavage activity is controllable by varying temperature and pH.
9. (canceled)
10. (previously presented) The intein of claim 1 wherein the intein is obtained from random mutagenesis of a truncated intein, followed by selection based on growth phenotype.

11. (previously presented)The intein of claim 1 wherein the intein has C-terminal cleavage.
12. (previously presented)The intein of claim 1 wherein the intein is a truncated Mtu intein.
13. (previously presented)The intein of claim 1 wherein cleavage rate is determined by an enzymatic reaction and not a chemical reaction.
14. (previously presented)The intein of claim 1 wherein the intein has the endonuclease domain deleted.
15. (canceled)
16. (previously presented)The intein of claim 1 containing the C-terminal histidine.
17. (previously presented)A protein including an intein of claim 1.
18. (original) The protein of claim 17 comprising a polypeptide of interest and the intein.
19. (original) The protein of claim 18 wherein the intein is in an inter-domain region of the polypeptide of interest.
20. (original) The protein of claim 17 wherein the protein comprises a binding protein portion, the intein, and a reporter protein portion.
21. (original) The protein of claim 20 wherein the intein separates the binding protein portion and the reporter protein portion.
22. (original) The protein of claim 20 wherein the reporter protein is an enzymatic assay protein, a protein conferring antibiotic resistance, or a protein providing a direct colorimetric assay.
23. (original) The protein of claim 20 wherein the reporter protein is selected from the group consisting of: thymidylate synthase,  $\beta$ -galactosidase, galactokinase, alkaline phosphatase,  $\beta$ -lactamase, luciferase, and green fluorescent protein.
24. (original) The protein of claim 17 wherein the protein comprises a binding protein portion, the intein, and a protein of interest portion.
25. (original) The protein of claim 20 wherein the intein separates the binding protein portion and the protein of interest portion.
26. (original) The protein of claim 17 comprising an external fusion of a polypeptide and the intein.
27. (original) The protein of claim 17 comprising an internal fusion of a polypeptide and the intein.

28. (original) The protein of claim 17 comprising a desired polypeptide and the intein, as either an internal fusion or an external fusion, wherein the intein is located before a serine, threonine or cysteine residue of the desired polypeptide.
29. (original) The protein of claim 17 comprising a desired polypeptide and the intein, wherein the intein and the desired polypeptide are separated by a serine, threonine or cysteine residue.
30. (original) The protein of claim 17 comprising a desired polypeptide and the intein, wherein the C-terminal histidine or asparagine or histidine-asparagine of the intein is immediately followed by the initial methionine of the desired polypeptide.
31. (original) The protein of claim 17 comprising a desired polypeptide and the intein, wherein the initial methionine of the desired polypeptide has been eliminated.
32. (original) The protein of claim 16 comprising a desired polypeptide and the intein, wherein the C-terminal histidine or asparagine or histidine-asparagine of the intein is immediately followed by the second amino acid of the desired polypeptide.
33. (original) The protein of claim 32 wherein the second amino acid of the desired polypeptide is lysine.
- 34-72. (canceled)